IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

A. Bart Flick

Serial No.: **09/613,961**

Filed: **July 11, 2000**

For: **MULTILAYER LAMINATE WOUND DRESSING**

Confirmation No.: **1541**

Group Art Unit: **3761**

Examiner: **Lewis, Kim M.**

Docket No. **120101-1010**

DECLARATION OF DAVID MARX

I, David E. Marx, do hereby declare the make the following statements.

1. I am an Associate Professor of Chemistry at Scranton University, Scranton, Pennsylvania. I have extensive experience in the field of electroless plating of polymeric materials, and have published numerous scientific articles in this area.

2. There is a difference between surface resistivity and the volume resistivity. Surface resistivity is defined as the ratio of the voltage to the current along its surface per unit of width of the surface. As a result, surface resistivity is numerically equal to the surface resistance between two electrodes forming opposite sides of a square. The size of the square is immaterial. The units of surface resistivity measurements are often expressed in Ohm/sq (Ohms per square). Volume resistance is defined as resistance of a conductor of unit length

with unit cross-sectional area. Volume resistivity is often expressed in units of Ohm-cm. This measurement would be indicative of the surface on which the metal is deposited and its value would vary considerably upon the nature of the substrate and deposition.

3. I have read the above referenced patent application and US Patent No. 6,004,667 (Sakurada, et al.). The Sakurada patent discloses depositing silver on a variety of surfaces via a low temperature melt injection (LMI) technique. This melt injection technique is capable of line-of-sight deposition of metal particulates on a surface. Thus, in the case of fabrics plated using this LMI method, crossover points between individual fibers or between fiber bundles will remain unplated. When such a fabric is conformed to a portion of the body, the fiber bundles will, of necessity, shift to allow the fabric to bend. This shift will result in unplated fibers and/or bundles contacting plated ones, severely disrupting the conductivity of the fabric.

4. There is no indication that the LMI material disclosed in Sakurada has a resistance of less than 1000 Ohms/cm^2, and even if it does, it is doubtful that a resistance of less than 1000 Ohms/cm^2 could be maintained in actual use of the material because of inconsistent application of the silver to the substrate. Since the surface resistivity is dependent upon the topography of the substrate along with the metal coating and **not on an inherent physical property** (volume resistivity) Sakarada does not disclosed the subject matter claimed in USSN 09/613,961.

5. The Sakurada patent illustrates, without mentioning specific measurements, that thick, cabbage-shaped grains are formed on the LMI substrate. See for example Fig 3c. Such coatings are highly susceptible to cracking upon flexing of the substrate. Indeed, careful examination of the middle portion of the micrograph reveals a disjointed metal surface between the fiber bundles. Conforming this material to a portion of the body will serve to exacerbate this cracking and severely compromise the conductivity of the surface.

6. The conformable, conductive fabric described in USSN 09/613,961 was produced using a solution electroless plating process, where the entire fabric is immersed in the plating solution. With this solution electroless plating technique, individual filaments within each fiber bundle are entirely encapsulated with metal. The solution reaches and plates the crossover points within the fabric, and a thin film of metal is deposited on all surfaces. The substrate and the thin metal film may both be flexed while preserving the integrity and conductivity of the metal surface.

7. While the Sakurada patent mentions the distribution of metal ions without galvanic cell action, it is further stated that silver and nickel particles are used because they are resistant to oxidation that can occur during LMI. On the other hand, the electrolessly-plated material in USSN 09/613,961depends on this oxidation of silver in order to release ions into the wound. The silver metal produced by electroless plating has a purity of 99%, with the remaining 1% being oxidized silver in the form of silver oxide. It is the oxidized silver that is

responsible for the release of silver into the wound, as silver oxide has a K_{sp} value of 1.5×10^{-8}, allowing silver ion to be released into the wound at the part per million level. Indeed, it has long been known, and previous work (as cited in chapter 16 of "Silver in Industry", Addicks, Reinhold Publishing, 1940) has indicated that pure, unoxidized, silver shows no ability to release ions and act as antimicrobial agents. Again, Sakurada fails to disclose or suggest the subject matter claimed in USSN 09/613,961. Sakurada teaches the use of the LMI technique to deposit conductive particles that are resistant to oxidation.

8. I hereby declare: (a) that all statements made herein of my own knowledge are true; (b) that all statements made on information and belief are believed to be true; (c) that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code; and (d) that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

David E Marx, PhD

David E. Marx, Ph.D.
Professor of Chemistry

11-19-04

Date